ANALYSIS OF VALIDITY OF EMISSION REDUCTIONS AS ERC

AIR PERMITS DIVISION
LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY

BATON ROUGE PLANT-UTILITIES UNIT
FORMOSA PLASTICS CORPORATION, LOUISIANA
BATON ROUGE, EAST BATON ROUGE PARISH, LOUISIANA
AI NO. 288, ACTIVITY NO. PER20090002

Background

The Formosa Plastics Corporation, Louisiana (FPC-LA) Baton Rouge plant is a synthetic organic chemical manufacturing facility producing vinyl chloride and polyvinyl chloride. FPC-LA operates a combined cycle cogeneration facility in the site's Utilities Unit. The cogeneration facility consists of three natural gas-fired General Electric stationary combustion turbines (Gas Turbines Nos. 1, 2, 3). Each gas turbine exhausts through a Heat Recovery Steam Generator (HRSG Nos. 1, 2, 3) equipped with a supplemental firing system (duct burner). Each gas turbine with its accompanying heat recovery boiler comprise Cogeneration Units 1, 2 and 3 (Emission Point Nos. 166, 167 and 212, respectively). The design basis for the Utilities Unit required operation of all three gas turbines and associated HRSGs to supply overall plant steam and electrical needs. While all the steam is used in the plant, a minor quantity of the power is sold. In addition, there are three standby package boilers to provide swing load process steam, allowing the turbines to operate at constant rates as steam demand varies and to provide plant steam during gas turbine downtime.

Cogeneration Unit No.1 was constructed in 1984. Maximum generator rating for Gas Turbine No. 1 is 44.9 megawatts (MW) (heat input of 541.25 MMBTU/hr); the HRSG No.1 duct burner is rated at 110.9 MMBTU/hr. The HRSG produces high pressure steam that powers a 12 MW steam turbine and provides saturated steam for process use. Cogeneration Unit No.1 was shut down on January 1, 2008.

Summary

A portion of the resultant NO_X and VOC emission decrease associated with shutdown of Cogeneration Unit No. 1 is surplus, permanent, quantifiable, and enforceable in accordance with LAC 33:III.Chapter 6-Regulations on Control of Emissions Through the Use of Emission Reduction Credits Banking. Accordingly, these reductions qualify as Emissions Reduction Credits (ERC). Amounts in the following table are given in tons per year (TPY).

Total NO_x ERC:

Source	Allowable Emissions Before Reduction[1]	Actual Emissions[2]	
Cogeneration Unit No. 1	253.60	216.50	216.50
		Adjusted allowable emissions (§607.C.3):	253.60
		Baseline emissions (§607.C.4):	216.50[3]
		Allowable emissions after reduction (§607.C.5):	0.00
		Surplus emission reduction (§607.C.6):	216.50
		Adjustments for netting (§607.D):	-0
		Total ERC:	**216.50**

[1] Permit No. PSD-LA-560(M-3), issued 9/12/06.
[2] Average of 2001 and 2002 actual emissions (§607.C.2).
[3] Baseline emissions shall be the lower of actual emissions or adjusted allowable emissions when the design value is not above the NAAQS for ozone (§607.C.4.a.ii).

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Louisiana promulgated a NO_X Reasonably Available Control Technology (RACT) rule (LAC 33:III.Chapter 22) on March 20, 2002. Beginning May 1, 2005, Chapter 22 required sources to reduce NO_X emissions during the five month ozone season, May 1 through September 30, inclusively. Typically, a stationary source reduces emissions below the baseline to generate surplus emission reduction credits. Due to the five month applicability of Chapter 22, the allowable emission limitation for a stationary source could potentially have two values, one for the five month ozone season, and another for the seven-month non-ozone season.

Thus, baseline emissions for a given stationary source, which are used to determine the surplus emission reduction (§607.C.6), could have two different values. In order to accurately determine the amount of ERC that can be used as offsets for nonattainment new source review (NNSR) permitting, baseline emissions and surplus ERC must be determined for the two time periods. Total NO_X ERC for any annual time period will consist of the ERC from the five month ozone season and the ERC from the seven month non-ozone season. Offset requirements for new sources derive from Section 173(a)(1)(A) of the Clean Air Act (CAA), which concerns "total" emissions and does not address the use of emission offsets for nonattainment permitting over periods of less than one year. Therefore, the NO_X ERC to be used in all NNSR permitting under LAC 33:III.504 must be determined by adding the ERC from the ozone season and the non-ozone season.

With respect to all offsets under Chapter 5 and all ERC under Chapter 6, the total NO_X emission increases during the ozone season must be offset by NO_X ERC from the ozone season. Non-ozone season NO_X increases may be met by either ozone or non-ozone NO_X ERC. The annual NO_X increase must be offset by the total combination of ozone and non-ozone season surplus NO_X emission reduction credits. See 67 FR 48093-48094 (July 23, 2002).

Ozone (O_3) season NO_x ERC:

Source	Allowable Emissions Before Reduction	Actual Emissions	
Cogeneration Unit No. 1	106.30[4]	90.75[5]	90.75
		Adjusted allowable emissions (§607.C.3):	106.30
		Baseline emissions (§607.C.4):	90.75
		Allowable emissions after reduction (§607.C.5):	0.00
		Surplus emission reduction (§607.C.6):	90.75
		Adjustments for netting (§607.D):	-0
		O_3 season ERC:	**90.75**

[4] 253.6 * 153/365
[5] 216.5 * 153/365

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Non-ozone (non-O_3) season NO_x ERC:

Source	Allowable Emissions Before Reduction	Actual Emissions	
Cogeneration Unit No. 1	147.30[6]	125.75[7]	125.75
		Adjusted allowable emissions (§607.C.3):	147.30
		Baseline emissions (§607.C.4):	125.75
		Allowable emissions after reduction (§607.C.5):	0.00
		Surplus emission reduction (§607.C.6):	125.75
		Adjustments for netting (§607.D):	-0
		Non-O_3 season ERC:	**125.75**

Total VOC ERC:

Source	Allowable Emissions Before Reduction[8]	Actual Emissions[9]	
Cogeneration Unit No. 1	2.30	1.50	1.50
		Adjusted allowable emissions (§607.C.3):	2.30
		Baseline emissions (§607.C.4):	1.50
		Allowable emissions after reduction (§607.C.5):	0.00
		Surplus emission reduction (§607.C.6):	1.50
		Adjustments for netting (§607.D):	-0
		Total ERC:	**1.50**

Analysis of validity

Timeliness

Per §615.A, all applications for banking emission reductions shall be submitted by March 31 following the year in which the reductions occurred. Cogeneration Unit No.1 was shut down on January 1, 2008. The application was dated March 20, 2009.[10]

Emissions reductions can be recognized as ERC only if they are determined to be surplus, permanent, quantifiable, and enforceable. Each criterion is addressed below.

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[6] 253.6 * 212/365
[7] 216.50 * 212/365
[8] Permit 0840-00002-10, issued 3/7/97.
[9] Average of 2001 and 2002 actual emissions (§607.C.2).
[10] See EDMS Document No. 40599809.

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Surplus

Procedures for calculating the surplus emission reduction are outlined in §607.C & D.

1. The design value for the nonattainment area is below the 1-hour national ambient air quality standard (NAAQS) for ozone. Per §607.C.4.ii, if the design value for the nonattainment area is not above the 1-hour national ambient air quality standard (NAAQS) for ozone, the department shall compare the actual emissions with the adjusted allowable emissions in order to determine baseline emissions.

2. Calculate actual emissions during the baseline period. Actual emissions during the baseline period of 2001 and 2002 were checked against the department's emission inventory database. NO_X emissions for Cogeneration Unit No. 1 during the baseline period were calculated to be 216.50 TPY (90.75 tons-O_3 season + 125.75 tons-non O_3 season). VOC emissions during the baseline period were calculated to be 1.50 TPY.

3. Calculate adjusted allowable emissions. Allowable emissions shall be adjusted to account for all new or revised federal or state regulations adopted that will require, or would have required, all or a portion of the emission reductions that comprise the ERC application. At the time of shutdown of Cogeneration Unit No. 1, the Utilities Unit was operating under Permits PSD-LA-560 (M-3) and 2915-V0, both issued September 12, 2006. During the baseline period of 2001-2002 the turbine was subject to Permits PSD-LA-560 (M-2) and 0840-00002-10, both issued March 7, 1997. At the time of issuance of both sets of permits, the gas turbine was subject to 40 CFR 60 Subpart GG-Standards of Performance for Stationary Gas Turbines, and the duct burner was subject to 40 CFR 60 Subpart Db-Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units. The department examined the federal regulations and found no additional new or modified federal requirements that would now be applicable to Cogeneration Unit No. 1.

   With regard to state regulations, the gas turbine and duct burner of Cogeneration Unit No. 1 were subject to LAC 33:III.Chapter 22 under Permit No. 2915-V0. LAC 33:III.Chapter 22 was promulgated on March 20, 2002, and had an effective date of May 1, 2005. §2201.D.1 sets NO_X emissions limits for stationary gas turbines and industrial boilers. Gas Turbine No. 1 and the duct burner in HRSG No.1 met Chapter 22 standards and did not require retrofit of additional NO_x control equipment. The department examined the state regulations and found no additional new or modified requirements that would now be applicable to Cogeneration Unit No. 1.

   Therefore, allowable emissions during the baseline period require no adjustment for new or revised federal or state regulations. Adjusted allowable emissions for Cogeneration Unit No.1 are the same as permitted emissions and for NO_X total 253.60 TPY (106.30 tons-O_3 season + 147.30 tons-non O_3 season) and for VOC total 2.30 TPY.

4. Quantify baseline emissions. Per §607.C.4.a.ii, if the design value is not above the NAAQS for ozone, baseline emissions shall be the lower of actual emissions (step 2 above) or adjusted allowable emissions determined in accordance with §607.C.3 (step 3 above). In this case, actual emissions are the limiting factors. Baseline emissions for NO_x total 216.50 TPY (90.75 tons-O_3 season + 125.75 tons-non O_3 season) and for VOC total 1.50 TPY.

5. Calculate allowable emissions after the reductions occurred. Cogeneration Unit No. 1 has permanently shut down and is being removed from the Utilities Unit under Permit No. 2915-V2. Therefore, allowable emissions after the reduction are zero.

6. Calculate the surplus emission reduction by subtracting the allowable emissions after the reduction occurred from the baseline emissions.

   NO_X: 216.50 TPY – 0.00 TPY = 216.50 TPY (90.75 tons-O_3 season + 125.75 tons-non O_3 season)
   VOC: 1.50 TPY – 0.00 TPY = 1.50 TPY

7. Finally, adjust for netting (§607.D). Emission reductions used in a netting analysis (i.e., to determine the *net emissions increase* as defined in LAC 33:III.504 or 509, as appropriate) that prevented the increase from being considered "significant" are not eligible for use as offsets. The quantity of emission reductions utilized to "net out" shall not be considered creditable. There is zero adjustment for netting as the emission reductions were not used in a netting analysis.

   NO_X: 216.50 TPY – 0.00 TPY = 216.50 TPY (90.75 tons-O_3 season + 125.75 tons-non O_3 season)
   VOC: 1.50 TPY – 0.00 TPY = 1.50 TPY

Permanent

The reduction is permanent because Cogeneration Unit No. 1 has been shut down and removed from Permit 2915-V2, which will be issued concurrently with this Emission Reduction Credit (ERC) certificate. Operation of Cogeneration No. 1 after issuance of Permit 2915-V2 would be in violation of LAC 33:III.501.C.2 and Section 2055 of the Louisiana Environmental Quality Act.

Quantifiable

Actual emissions from the turbine and duct burner were calculated using approved EPA methods, EPA emission factors, factors developed through stack tests performed in accordance with approved EPA methods, measurements of the steam/fuel ratio, fuel consumption, and other process and production data.

Enforceable

Finally, the reductions are enforceable via Permit No. 2915-V2, issued concurrently with this grant of the Emission Reduction Credit (ERC) certificate. Further operation of Cogeneration Unit No. 1 would constitute operation without a permit in violation of Louisiana environmental regulations and the Louisiana Environmental Quality Act.